wants of gardeners, agriculturists, and amateurs, for whom it is intended; but it may well be questioned whether the photographs convey so good an idea of the subject as can be obtained from the almost numberless wood-cuts, and other illustrations in the text-books of plant-diseases. Naturally, the best figures are those which represent the teleutospores; but even these are no better than most of the wood-cuts with which the botanical public is already sufficiently familiar; and the figures giving the gross appearances of the fungi, both in their uredo and aecidial conditions, are almost worthless, although the original preparations were evidently excellent. However valuable photography may be in representing minute forms like bacteria, or certain structures which can be seen with very low powers, it is evidently not adapted to those plants which, like ordinary moulds, rusts, etc., require a moderately high power. The execution of the plates of the atlas is as good as that of any similar work which we have seen; but, judging by the result, it would seem to be better to abandon photography altogether in such cases.

NOTES AND NEWS.

— THE Kongo conference makes its appearance in all the geographical periodicals, generally accompanied by a map of greater or less value. We shall ourselves publish a map in our next issue. Besides innumerable lectures and addresses, the republication of the conclusions of the international commission has been made by nearly every geographical periodical of note. Karl Winter of Heidelberg has just issued a neat pamphlet of a hundred and twenty pages, in which the history and final agreement, forming one of the most remarkable results of modern civilization, are set forth clearly and briefly by C. A. Patzig, with the title, 'Die afrikanische konferenz und der Congostaat.'

— The mittheilungen of the Vereins für erdkunde zu Halle an der Saale for 1884 is largely devoted to Thuringia. Rackwitz has an anthropological article illustrated by an interesting chart of the distribution of antiquities, customs, boundaries of dialect, etc.; Reischel, a discussion on the orohydrography of the central Thuringian basin; Edler discourses on sun-spots; and David Brauns furnishes an interesting paper on the distribution of vertebrates in Japan.

— The Argentine expeditions into Patagonia have raised the credit of that country, which has long been supposed arid and sterile. The report of Gen. Villejas, and that of Col. Roa who has travelled more than five hundred leagues in Patagonia, affirm that the region near the base of the mountains is rich, not only in metals and minerals, but in fertile valleys which nestle between spurs of the range. With steam-transportation between the mountains and the coast, it is affirmed that rapid growth of population might be expected, and prosperous communities be established.

— The expedition of Dr. Bunge of the Lena international station had not been heard from for some time, and some anxiety was felt for its safety. A recent telegram announces its safe arrival at Yakutsk.

— Sibiriakoff, the wealthy Russian merchant, well known as the friend and patron of Nordenskiöld, has himself made an interesting journey during the summer of 1884. The details of it are only now made public, as news travels slowly in those regions. He ascended the Petchora to Oranets, then crossed the Ural to the Sigva or Whitefish River, which joins the Sosva, an affluent of the Obi. The traveller reached Shikurik Sept. 21, and Tobolsk Oct. 18. It is demonstrated by this journey, that a trade route by which goods can be carried in summer is practically open in this direction, a matter of great commercial importance to Siberia.

— J. Chaffaujon has been engaged in exploring the region of the Orinoco, and has already rectified many errors of the charts of its course. He has started from Bolivar, Venezuela, on another journey, which is expected to take him into unknown districts of its head-waters.

— A work interesting to the philologist, geographer, and anthropologist, is that of l'abbé Pierre Bouche on the slave coast and Dahomey. The author spent seven years among the black barbarians of this region, and became familiar with their vices and virtues. It is furnished with a map, and issued by Plon at Paris. The same firm are publishing a large number of geographical or partly geographical works at very modest prices. Among these may be noted a translation of Gilder's 'Rodgers' expedition,' Clapin's 'Le Canada,' and Count Raymond de Dalnias' 'Les Japonais,' which has had a very favorable reception. A life of François Garnier, the French Cortez of Annam, has been published by Dreyfous. Recent events in Tonkin have recalled his marvellous career and romantic death, which, embodied in a novel, would have been criticised as too improbable for literary art.

— Further particulars of the fate of the African explorer, Richard Boehm, have been received in Germany. He died of fever, caused by over-anxiety and fatigue, on the 27th of March, 1884. His camp was in southern Urna, — three days' journey from Lake Upamba, recently discovered by him and Reichardt. After the death of his companion, Reichardt tried to go on alone to the sources of the Lualaba, but was obliged finally to fight his way back. The letter just received from him is dated from Karema on Feb. 20 of this year.

— A telegram received at Berlin from Alexandria announces that the African travellers, Dr. Juncker and Casati, have arrived at Lado, an Egyptian mili-

tary station on the Bahr-el-Jebel. The travellers were engaged in exploring the Nyam-Nyam district, between the tributaries of the Nile and the Upper Kongo. Nothing had been heard of them for a long time, and it was feared that the Mahdi had cut off their retreat.

— The exhibition of metal-work at Nuremberg was opened on the 15th of June. The Japanese exhibits arrived late, in over fifty packing-cases.

— A new exhibition was opened in Paris July 26: it is called the Exhibition of industry, and presents some analogy to the English inventions. It will remain open till the 23d of November. It is to be held at the Palais de l'industrie; and, naturally, electrical matters will be of primary interest. The commissioner-general of the undertaking is Mr. de Redon; and the committee includes some well-known names, such as those of Lemonnier, Tarraut, Milde, Boistel, de Meritens, Cance, etc. Electricians, in fact, form a considerable majority.

— *Nature* states that the third session of the International geological congress, which was postponed last year on account of the cholera on the continent, is fixed to be held this year on Sept. 28, at Berlin, under the honorary presidency of the veteran geologist of Rhineland, Dr. H. von Dechen. The president of the organizing committee is Professor Beyrich; and the general secretary, M. Hauchecorne, 44, Invalidenstrasse, Berlin.

— The New-York *Evening post* publishes the following: I just learn from a newspaper that the commission which investigated the Coast-survey reflected upon me in their report as follows: "That for several years, beginning in 1873, C. S. Peirce, assistant, has been making experimental researches with pendulums, without restriction or limitation as to times and places; that since 1879, expenditures on account of those experiments, aside from salaries of chiefs and assistants, amount to about $31,000; that the meagre value of those experiments to the bureau have been substantially destroyed." I have immediately addressed a letter to the secretary of the treasury, of which the following is the substance: 1°. My expenditures, aside from compensation of myself and my assistants, during the period specified, have not amounted to one-third of the sum named; and I appeal to the secretary to ascertain this by the addition of the amounts of my original accounts now on file in the department. 2°. All my operations have been carried on under specific instructions, and therefore have not been "without restriction or limitation as to times and places." I ask to be informed what operation does not appear to be covered by instructions on file in the office, and promise to show, in any instance, that it really is so covered. 3°. No records have been destroyed. 4°. I maintain the value of determinations of gravity in general, and the excellence of mine in particular. 5°. I tender my resignation if the opinion expressed as to the meagre value of my services is accepted by the department. Until my letter is acted upon, it might perhaps be considered a breach of official etiquette for me to make it public; but I wish you, as a friend and scientific man, to know that I have a defence against the accusations made. C. S. Peirce.

Ann Arbor, Mich., Aug. 10.

— The *Romaji zasshi* is a journal recently established in Japan, with the object of introducing the use of the Roman alphabet to spell phonetically the Japanese words. The journal is partially supported by the government, and is the official organ of a society of some forty-two hundred members, which aims to do away with the Chinese characters in Japanese literature.

— A late report upon the Cambridge (Eng.) local lectures, by Mr. Roberts, contains (says the London *Graphic*) an interesting story of the pursuit of scientific knowledge under difficulties. Two miners at Backworth, in Northumberland, in order to attend a course of lectures on chemistry at Cramlington, five miles off, walked after their day's work to that place and back in order to attend every lecture. They made sufficient notes to enable them on each occasion to retail what they had heard to a class formed by them at Backworth, and actually repeated the experiments, so far as rough apparatus and their means would allow. The lecturer visited this little class (there were only seven in all), and found upon examining them that they had acquired a sound knowledge of the first steps in chemistry. This germ has now blossomed into 'The Backworth students' association,' consisting entirely of miners. It is not often that such a splendid instance of self-help is offered for our admiration, and, we may add, imitation.

— The death of the distinguished zoölogist, Henri Milne-Edwards, so long connected with the Paris museum, is announced to have occurred on July 29 last. He was a Belgian by birth, and spoke English fluently. His son Alphonse has been, in recent years, almost as well known, his father's age (he was born in 1800) preventing much literary activity.

— We learn from *Nature*, that, on July 10, at about noon, a wonderful mirage was seen on Lake Wettern, in Sweden, by a number of people between the villages of Fogelsta and Vadstena. A small island in the lake appeared as if covered with the most gorgeous flora, and tall gigantic trees, forming great groves, between which buildings having the appearance of the most splendid palaces were seen. The Sandö, another little island, seemed to rise out of the sea many times its actual height, its sandy shores looking like lofty castellated walls. It had the exact appearance of a mediaeval fortress enclosed by four walls. Two other little islands, Åholmen and Risön, appeared also as lofty towers above the water. The mirage lasted for nearly half an hour, when it disappeared somewhat rapidly.

— Inspired, apparently, by the success of Marvin's 'Russians at the gates of Herat,' Mr. Archibald Ross Colquhoun — the author of 'Across Chrysê,' and special correspondent of the London *Times* in China — has written a little book of fifty-eight pages on Bur-

ma and the Burmans, or 'The best unopened market of the world' (London: Field & Tuer). The late massacres in Mandelay, the capital of independent Burma, have drawn public attention to that part of the globe which the recent actions of the French in Tonquin and southern China have not tended to allay. Probably no one is better qualified by actual observation for his task than Mr. Colquhoun; and this readable essay, with its map and statistical table, should receive the careful consideration of all who are interested in what may at any day become the farthest eastern question.

— The Ann-Arbor meeting of the American association opens Aug. 25, and closes Sept. 1, not Sept. 10 as erroneously stated in some of the circulars.

— The special association train will leave Buffalo at six A.M., Aug. 25, will stop three hours at Niagara Falls, and arrive in Ann Arbor at 8.23 P.M.

— The Fitchburg railroad requests us to announce that tickets to Ann Arbor and return, by the Hoosac-tunnel line, will be sold at reduced rates.

— The *Annuaire géologique universel et guide du géologue* is the title of a projected annual, of which the first volume has lately been received. It is edited by Dr. Dagincourt of the 'Comptoir géologique de Paris,' and contains articles on a number of different countries by competent geologists. The chief object of the work, as stated in the preface, is to give lists of the geologists of various countries, so as to increase the range of professional acquaintance; to indicate to the tourist the principal collections and localities that he should visit, and to record the annual progress of each nation. Only three months of preparation have been spent on the first volume; its publication having been hurried, that it might appear before the meeting of the geological congress at Berlin in September, and that it might give rise to criticism from which the editor hopes to profit. The materials thus collected embrace brief geological sketches of several countries, North America being treated by de Margerie of Paris; accounts of official surveys, publications, and maps; lists of societies and local geologists, and of universities and museums; notes on recent geological works. This programme is by no means uniformly carried out: uniformity in execution would be a manifest improvement. The printing is not done with sufficient care; and, in the list of addresses, the errors are seriously numerous.

— Mr. Clement L. Wragge is arranging, says *Nature*, for the establishment of a meteorological station in northern Queensland and New Guinea. He hopes to establish an observing station at Port Moresby. An assistant will carry on the work of the Torrens observatory. Mr. Wragge is also arranging for the continuance of his observatory on Mount Lofty.

— Two important papers have lately appeared on the reddish corona around the sun, — one by Kiessling of Hamburg, who has already given the best statement of the optical process by which the ring is formed; the other by Forel of Morges, Switzerland, who has suggested that the corona be called 'Bishop's ring,' after its earliest observer, the Rev. Sereno E. Bishop of Honolulu, who noted it on Sept. 5, 1883. The recent papers are concerned with the extension of the area of first visibility; and both writers conclude that there is no question of the connection of the ring with the famous sunsets, or of the origin of both of these remarkable phenomena in the dust thrown out from Krakatoa. Kiessling quotes with approval the name suggested by Arcimis of Madrid, 'Corona solar krakatoense.' The need of observations, especially at elevated stations, to determine the duration of the ring's appearance, is emphasized. Mount Washington and Pike's Peak should afford good records.

— On Tuesday morning, July 14, an earthquake occurred in eastern and central Bengal which, according to *Nature*, is said to have been the severest one experienced by the inhabitants for forty years. The shocks lasted for nearly a minute. In Calcutta, the houses rocked and cracked, and the plaster fell in large quantities. There was general consternation, the people all rushing out of doors. A wave was raised in the river like a bore, causing some anxiety with respect to the shipping. Luckily no accident occurred, and no damage was done beyond the cracking of the walls of some old houses; but, had the shocks lasted some seconds longer, the city would probably have been laid in ruins. Some of the up-country stations were less fortunate. At Serajgunge, a chimney belonging to some jute-mills fell. In many other places some of the houses fell, and people were killed. Twenty-five deaths are reported to have occurred at Aheripore, five at Bogara, eleven at Azimgunge, and several at Dacca. The following morning another shock was felt in Cashmere, which did some injury. According to the latest reports, the earthquake caused altogether seventy deaths in Bengal.

— Tuttle's comet of 1858 was seen at Nice on Aug. 9. Johannes Rahts, a german computer, has calculated an orbit from the observations made at the 1858 and 1871–72 appearances, with the perturbations of the principal planets included. His ephemeris agrees with the place in which the comet was found within fifteen seconds of time, and about six minutes of arc; so that, by pointing the telescope to the computed place, the comet would be in the field of view after an absence of nearly fourteen years. Using his elements, the perihelion distance of the comet is ninety-five million miles, and the aphelion distance nine hundred and sixty-seven million, the period being 13.76 years. According to these data, the comet, at its nearest approach to the sun, is at about the same distance as the earth, and, at its farthest distance, it is about a hundred million miles beyond the orbit of Saturn. It will slowly approach the earth and its light increase during the present month, its distance at time of discovery being a hundred and seventy-five million miles. It will not, however, become visible to the naked eye. This is one of five comets discovered by Mr. H. P. Tuttle at Harvard college observatory, two others besides this having been discovered in 1858.

— *Nature*, for Aug. 6, in its leading article, quotes with approval, and re-enforces with new arguments, the claim which *Science* made last February, that great saving could be effected upon the introduction of prime-meridian time suggested by the Washington conference, by the virtual amalgamation of the nautical almanacs now published separately by each of the maritime nations, and commends our suggestion that the money thus saved should be expended upon an international mountain observatory. The same number contains a long article on the coordination of the scientific bureaus of our government, based upon the two schemes proposed by the committee of the national academy, and by Major Powell, which appeared some time since in *Science*. The article on the Lick observatory, which we published last June, is also given in full. We shall shortly print another, with illustrations.

— Another exhibition, to be held in New Orleans, is proposed for next winter.

— A short time before his death, Prof. H. R. Göppert of Breslau, in connection with the chemist Professor Poleck, made a study of the Hausschwamm, — a fungus commonly known with us as dry-rot, which had caused great injury to buildings in northern Germany. The results of their combined studies now appear in a pamphlet by Professor Poleck (Der hausschwamm, Breslau, 1885). The dry-rot, Merulius lacrimans, seems to be unknown in a wild state in Germany, but is confined to wood-work of different kinds, and attacks by preference, coniferous timber. Strange to say, the fungus does not usually infest old structures, but generally makes its appearance in comparatively new buildings; and a startling series of figures shows the amount of damage done in the region of Breslau. Chemical analyses by Poleck show that the merulius is particularly rich in nitrogenous compounds and fat, which is rather remarkable, when one considers the chemical constituents of the timber on which it grows. Injury to health, or even death, is said to result from exposure to air containing large quantities of the spores of the merulius; and several authenticated cases are reported. In a supplementary note, Poleck considers the relationship of merulius to actinomyces, a fungus which causes a characteristic disease in man and cattle; and he apparently comes to the conclusion that what is called actinomyces is probably only the merulius altered by the peculiar matrix on which it is growing. His statements on this point can hardly be called conclusive, or, in fact, other than vague.

— An interesting new limuloid crustacean from the Upper Chemung of Erie county, Penn., is described in the *American journal of science*, under the provisional generic name of Prestwichia. It occurs at the junction between a bluish sandstone and a soft fine shale, which, in the process of weathering, has worn away, leaving a sharply defined cast in hard sandstone.

— In Vallorbes, in Switzerland, there are several important fish-cultural stations for the development of trout, the chief of which are on the borders of Lake Neuchâtel. From 1864 to 1870 the station at Poissine has placed in the neighborhood of 450,000 young fry in the rivers, and from 1872 down to the present time more than 1,000,000. By this means the rivers have been restocked in a very satisfactory manner, and the trout of Vallorbes are far-famed. This total would have been much larger had it been possible to secure the required number of eggs. In 1885, 74,000 fry were developed; the eggs being placed in the incubating cans from the 10th to the 20th of April, and in the stream, between the 20th and 31st of May, according to the rapidity of development.

— The industry of gutta-percha production, which has been so profoundly menaced by the vast destruction of the trees by the natives, is likely to be greatly increased in importance by the discovery of Mr. Edward Heckel, recently published in *La nature*. Dr. Heckel has announced that there is a tree in central Africa, Butyrospermum Parkii, called by the natives 'karité' or 'caré,' which is likely to replace the gutta tree. The berries of this tree produce a stearic wax called 'butter of karité,' and valued highly by the natives and travellers. The tree covers the vast tropical area of central Africa in dense forests; and, after it has attained the age of four years, it is possible by discrete incision to obtain from its trunk and larger branches an annual supply of four kilogrammes of gutta ($5–6 per year at the present price) without injuring the tree in the least. By reason of the great facility with which this tree grows in all kinds of soil, and because of the success attending its cultivation in a few places, Mr. Heckel thinks that it can be profitably transplanted into the English and French colonies. Guided by botanical analogy, he also suggests it as highly probable that the Indian species of Bassia will give a product similar to that of the karité of Africa.

— By a congratulatory letter addressed to him by the society upon the occasion, Professor Asa Gray was recently reminded that fifty years have elapsed since he was elected a member of the oldest natural-history society in Germany, the imperial Academia leopoldino-carolina naturae curiosorum.

— Dr. A. W. Ljungman has been granted by the Swedish government the sum of 350*l.*, in addition to his salary, for investigating the herring and the herring fishery on the south-west coast of Sweden.

— The twelfth number of the German *Colonialzeitung* contains an article by Herman Soyaux on experimental cultivation in tropical Africa. He maintains that the soil is suitable for agriculture, though it is exhausted in a year by the cultivation of maize and manise: he recommends the cultivation of coffee, vanilla, India rubber, tobacco, cotton, and sugar-cane according to the varieties of soil. Lieut. de Gile, commander of the Upper Kongo division, has published a most enthusiastic description of the country, where nearly all the above-mentioned plants, and many others, grow naturally, or are already cultivated. He represents the climate as healthy, and the country thickly populated.